

THE GENITALIA OF A GYNANDROMORPH *DELIAS HARPALYCE* (DONOVAN) (LEPIDOPTERA: PIERIDAE)

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Abstract

The genitalia of a bilateral gynandromorph of *Delias harpalyce* from Victoria are described and compared with those of normal individuals.

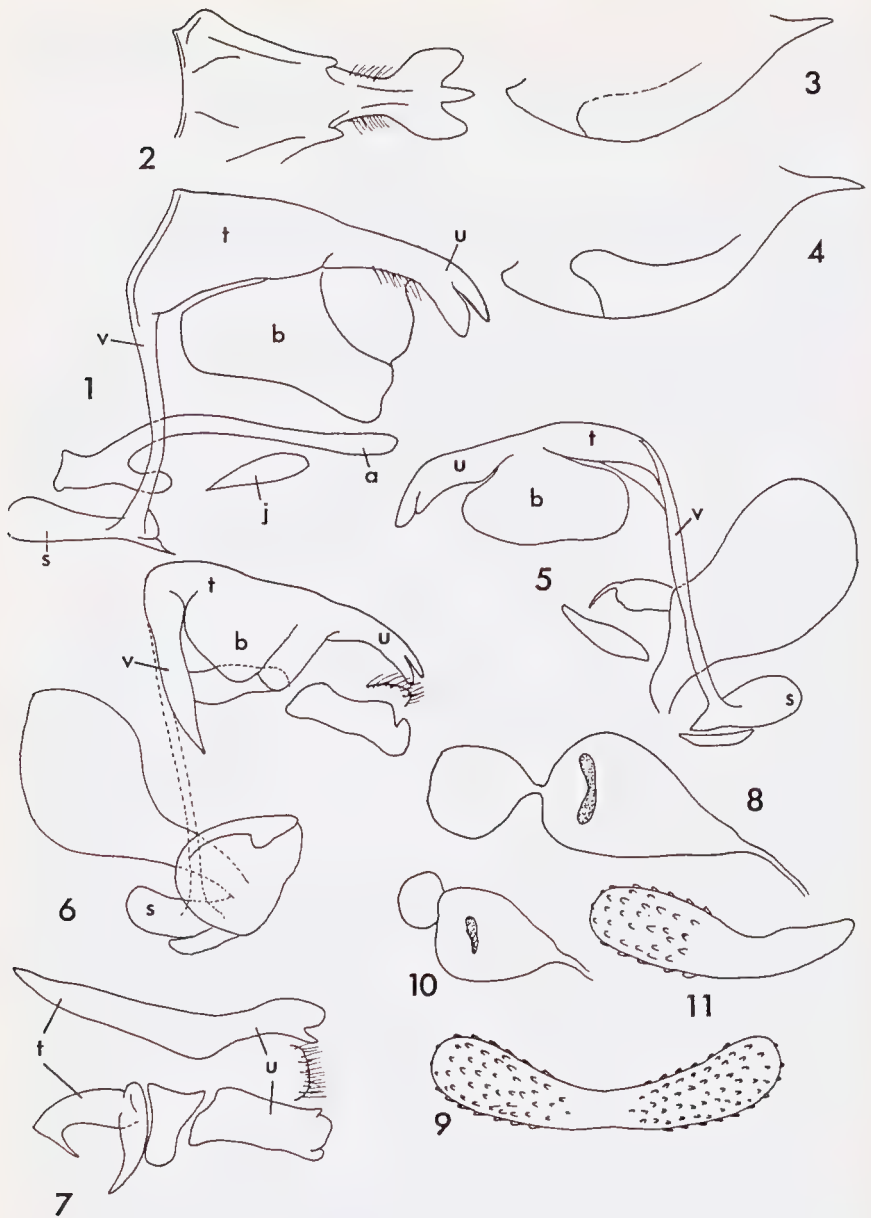
Introduction

Bilateral gynandromorphs have been recorded for many butterfly species and have been presumed to develop from binucleate ova (Cockayne 1935), or from bilateral differentiation at the time of formation of the first two blastomeres (Clarke and Ford 1980). The causes of this developmental abnormality are by no means clear, although there are suggestions that disease, parasitisation, or abnormal temperature regimes could induce it (review by Scriber and Evans 1988). Some tendency for multiple occurrences of gynandromorphism in the same brood in laboratory reared Lepidoptera has been noted (Cockayne 1935).

Scriber and Evans (1988) recorded 10 (five bilateral) gynandromorphs from 28,000 reared *Papilio glaucus* L., and Emmel and Boender (1990) noted two gynandromorphs in six years from about 500,000 *Heliconius melpomene* (L.) reared in the Florida 'Butterfly World'. Gynandromorphs in natural populations are undoubtedly rare, though their abundance is difficult to quantify. They are most conspicuous in sexually dimorphic butterflies and a survey of natural occurrences by Scriber and Evans (1988) included records for 10 species of Pieridae.

The purpose of this note is to record the capture of a bilateral gynandromorph (left side female, right side male) of *Delias harpalyce* and to describe briefly its genitalia. Because such specimens are highly prized by collectors they are only rarely available for dissection and detailed examination. The present specimen (Victoria, Greensborough, 37°42'S 145°06'E, 20 May 1990) was captured by Miss Kim Zammit. I have not made an extensive search for additional records of gynandromorphic *D. harpalyce*, but am aware of two other specimens (Australian National Insect Collection, Museum of Victoria). These have not been dissected.

Genitalia of the Greensborough specimen were examined after clearing the abdomen and storing it in glycerine. Comparison was made with normal individuals of both sexes: a fresh reared female was used to avoid any complication of bursal change induced by fertilisation or oviposition, and the male was from a Greensborough population.



Figs 1-11. *Delias harpalyce*, genitalic structures: (1-3 normal male; 8, 9, normal female; 4-7, 10, 11 gynandromorph) 1: genitalia, lateral, valvae omitted; 2: tegmen and uncus, dorsal; 3, 4: inner aspect of ventral part of right valve; 5: genitalia from right side; 6: genitalia from left side; 7: genitalia, dorsal; 8, 10: corpus bursae; 9, 11: signum, ventral. Abbreviations on Fig. 1: a, aedeagus; b, brachium; j, juxta; s, saccus; t, tegmen; u, uncus; v, vinculum.

Structure

Genitalic elements of both sexes are present in the gynandromorph, but are unilaterally distorted or modified on the side displaying the external characters of the opposite sex.

Male. Typical male genitalia of *D. harpalyce* are shown in Figs 1, 2. In the gynandromorph, the right valve is complete and the left is absent. The valve is similar in size to that of a normal male and is undistorted: the apical prominence is slightly longer and more tapered and the ventral 'pocket' on the inner side somewhat more pronounced (Figs 3,4), both probably reflecting normal variation. The vinculum is complete on the right side (Fig. 5) but reduced to a small tapered projection from the tegmen on the left side (Fig. 6). The tegmen itself is shortened anteriorly and the uncus divided medially (Fig. 7) with the right side complete and the left side extensively fragmented and distorted; a distinct transverse setose lobe is present between the two halves, and the left structures are displaced ventrally. The juxta is present, though shortened, and the aedeagus is indistinct. The saccus is shorter than in normal specimens, and the normal broad brachia flanking the tegmen are strongly reduced on the right side and slightly so on the left side. This brachial reduction is anomalous, as it does not reflect the prevailing bilateralism.

Female. The normal corpus bursae of *D. harpalyce* (Fig. 8) has a rounded anterior lobe, extends forward to about abdominal segment III, and supports a single transverse arcuate signum with expanded papillate/dentate arms (Fig. 9). In the gynandromorph the anterior bursal lobe is poorly defined and the main chamber of the bursa reduced in size (Fig. 10). The signum is reduced and asymmetrical (Fig. 11); left side normal and the right side a small sclerotised tapered lobe without ornamentation. The genital chamber is represented only by the left side. There is also a large bladder-like median structure extending more than half the depth of the abdomen (Figs 5, 6): its homologies are not clear.

Comment

The structure in general reflects the true bilateral nature of this individual. Each side bears genitalic structures typical of the sex on that particular side but severe distortion occurs at the midline or shortly beyond it. In some cases (male valve, female genital capsule) the corresponding structure is absent on the 'opposite' side; in others (male uncus, female signum) the structures are recognisable but abnormal. Median structures, such as the aedeagus, are most severely distorted.

Acknowledgment

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References

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